SPECIES CONSERVATION STRATEGY AND MONITOR PLAN

For Blechnum spicant

For Northern Idaho

Idaho Panhandle National Forests

And Clearwater National Forests

June 1992

7

Jill Blake
Idaho Panhandle National Forests
3815 Schreiber way
Coeur d'Alene, ID 83815

Chris Ebrahimi
Idaho Conservation Data Center
Idaho Department of Fish & Game
P.O. Box 25
Boise, ID 83707

TABLE OF CONTENTS

List of Appendices

INTRODUCTION

Forest Service policy requires that the Forest Service maintain viable populations of all native and desired non-native wildlife, fish and plant species in habitats distributed throughout their range on National Forest System lands (FSM 2670.22). A viable population structure consists of the number of individuals adequately distributed throughout the species range necessary to perpetuate its existence in natural, genetically stable, self-sustaining populations.

The Forest Service, along with other Federal and State agencies, has recognized the need for special planning considerations in order to protect some of the rare flora and fauna on the lands in public ownership. Species recognized by the Forest Service as needing such considerations are those that (1) are designated under the Endangered Species Act as threatened or endangered, (2) are under consideration for such designation (C1 candidates and Proposed species), or (3) appear on a Regional Forest Service sensitive species list.

*Blechnum spicant (*deerfern*)* is presently listed as a Region 1 Sensitive species. A sensitive species is defined as a plant species for which the Regional Forester has determined there is a concern for population viability, as evidenced by a significant current or predicted downward trend in population of habitat (USDA R1 FS 1988). Forest Service policy states that Sensitive native plant and animal species must receive special management emphasis to ensure their viability and to preclude trends toward endangerment that would result in the need for Federal listing (FSM 2672.1).

Blechnum spicant is a Pacific coastal disjunct in northern Idaho. The species is only known from 14 populations in Idaho, all within forested communities that are often subject to intensive timber management. Deerfern has been affected by past timber harvest activity, and has the potential of being present in future sites proposed for timber removal.

The objective of this Conservation Strategy is to outline a plan for managing *B. spicant* in northern Idaho, specifically on the Idaho Panhandle and Clearwater National Forests, which will allow for the species' survival through time. This strategy is divided into two major sections. The first summarizes the most recent biological information about deerfern. The second section identifies the management and monitoring strategies needed to understand and conserve the species. Included in this plan is documentation of the 1991 procedures for the establishment of seven monitor plots in a deerfern population west of Priest Lake.

This guide will be updated periodically as new information is obtained, and as the monitor plot information is evaluated.

BIOLOGICAL INFORMATION

Plant description

Blechnum spicant(L.) Roth. Is a member of the Blechnaceae family. The taxon was first discovered in Europe and characterized as Osmunda spicant L. (Linnaeus 1753).

Blechnum spicant is an evergreen perennial fern with two kinds of fronds. Sterile fronds are leathery, shiny dark green and grow in a clump. Fronds are once [pinnate into smooth-edged pinnae that attach to the main leaf rachis. Fertile fronds are taller, erect, and divided into very narrow segments that bear spores.

The following technical description is adapted from Hitchcock et al. (1969):

> Evergreen, perennial fern with a short-creeping rhizome: leaves once-pinnate with broadly sessile pinnae; sterile leaves 2-8(10) dm, petiole 3-25 cm, reddish – or purplish – brown, pinnae generally 1-5.5 cm x 3-7(10) mm; fertile leaves generally surpassing the sterile and with petiole up to 50 cm, fertile pinnae about as many and as long as the sterile, but only 1.5-2 mm wide.

An illustration of B. spicant from Hitchcock et al. (1969) is found in Appendix A.

Range and Distribution

Deerfern is an interruptedly circumboreal species that extends south to California along the west coast. It is found chiefly west of the Cascade Mountains in North America but occurs in disjunct populations in southeastern British Columbia and northern Idaho (Lorain 1988). Populations in Idaho are found in Boundary, Bonner, Idaho, and Clearwater counties. A total of fourteen populations are known in the state. All are found on National Forest land: four on the Idaho Panhandle National Forests and ten on the Clearwater N. F.

A map of the total known distribution of this species is found in Appendix B, and a distribution map for the Idaho populations is in Appendix C.

Background Information

To date, there are 14 known populations of deerfern in Idaho, ten on the Clearwater N.F. and four on the Idaho Panhandle N.F..

The first three populations of *Blechnum spicant* in the state of Idaho were discovered on the Clearwater N.F. in 1970 (Conservation Data Center 1991). Between 1975 and 1991 six were found in May of 1992. Of these ten populations, seven are restricted to the North Fork Clearwater

River drainage on the North Fork ranger District, one population occurs near Musselshell and one near Gold Creek on the Pierce Ranger District, and two populations occur near Glade Creek Meadows along a tributary of the Lochsa River on the Lochsa Ranger District.

The first of four currently known populations of deerfern found on the Idaho Panhandle N.F. was discovered in 1988. This population consists of a single individual and is located within the Bottle Lake Research Natural Area near Priest Lake. Two additional deerfern populations were documented in 1990; one is west of Distillery Bay on Priest Lake, and the other is north of Upper Priest Lake near Cedar Creek. A population near Lightening Creek was discovered in 1991.

There have been some research studies completed for deerfern. Three of these have included a population in north Idaho (Soltis' and Soltis' 1988 research included the North Fork Clearwater River population; the other Idaho population in Cousens' 1981 study was not specified). Two of these studies discuss genetic variability and reproduction (Cousens 1973, and Soltis and Soltis 1988). Another focuses upon habitat and vigor of different populations, and observations of gametophytes (Cousens 1981). Pertinent information from these papers is included in this document.

Overall, it was found that the Idaho populations do not differ genetically from the principle distribution of those found along the West Coast. It has been speculated that the Idaho population studied has developed unique physiological adaptations. Compared to deerfern habitat variables noted on the Olympic Peninsula, Idaho populations occur where air temperatures are strikingly colder, the growing season is shorter, and snowfall is more abundant and persistent (Cousens 1981).

Horticulturally, deerfern is noted as an easily grown, choice garden plant (Hitchcock and Cronquist 1973). West of the Cascades the species provides considerable forage for domestic and wild animals, hence the common name (Hitchcock et al. 1969). (There is no evidence of wildlife grazing on the Idaho populations.) On the west side of the Olympic Peninsula, cattle often over-wintered on deerfern.

Habitat Requirements

In its major West Coast range, *B. spicant* is a shade tolerant, submontane to alpine fern. It occurs in low elevation coastal areas, to coastal subalpine boreal and summer-wet cool to moderately warm climates on fresh to very moist, nitrogen poor soils (Klinka etal. 1989). Its occurrence decreases with increasing continentality. It is scattered to abundant (occasionally dominant) in old growth coniferous forests on water-receiving sites, and is sporadic and less vigorous on water-collecting sites (Klinka et al. 1989). Deerfern grows best on decomposed organic materials; on nutrient-rich soils, confined to decaying coniferous wood (Klinka et al. 1989). Cousens (1973) found that it grows best in very wet areas of the *Tsuga heterophylla* (western hemlock) zone of the Pacific Northwest where *Oplopanax horridium* (devil's club) and *Lysichitum americanum* (skunk cabbage) are abundant.

In Idaho, deerfern populations generally occur at mid-elevations (between 3000' and 4500') in moist mineral soils of shaded, mature western redcedar (*Thuja plicata)* and western hemlock (*Tsuga heterophylla)* forests. Populations are mostly found in the very moist *Thuja plicata* series of *Thuja plicata/Oplopanax horridum, T.plicata/Athyrim filis-femina,* and *T.plicata/Adiantum pedataum* habitat types. However, the species can be found throughout the *Thuja plicata* and

*Tsuga heterophylla*series. In addition, a single population ahs been discovered along a seepage within the *Abies grandis* series in a seral lodgepole pine (*Pinus contorta*) stand and another population occurs along a swamp edge within a *Tsuga mertensiana/Clintonia uniflora* habitat type.

Population and Reproductive Biology

B. spicant is a very long-lived evergreen perennial. Reproduction is primarily sexual, the fertile leaves producing thousands of wind-dispersed spores, which are released in midsummer (Soltis and Soltis 1988). Vegetative reproduction in deerfern is limited; the rhizomes are short-creeping and do not form extensive clones (Hitchcock and Cronquist 1973).

Vegetative vigor of *B.spicant* was estimated in five separate populations, including one in north Idaho (Cousens 1981). By measuring the length and width of sterile fronds and by counting their fronds, plants were placed in one of six life-history classes: (1) gametophytes; (2) gametophytes with sporophytes; (3) sporophytes , all with juvenile leaves; (4)sporophytes, mixed juvenile and adult leaves (5) sporophytes, all adult leaves, sterile; and (6) sporophytes, all adult leaves, including fertile.

Cousens (1981) discovered deerfern gametophytes in three ways: (1) populations that colonized large areas of soil where a cover of mosses and *Selaginella* had slipped; (2) smaller populations often found on clods of soil turned up by elk and deer; and (3) isolated gametophytes found only by systematic sampling of undisturbed forest floor. These findings suggest that gametophyte establishment occurs best on open soil areas. Gametophytes were first found in early fall, grew vigorously over the winter, and produced sporophytes through late spring (Cousens 1981). Cousens (1981) thought that competition among gametophytes was minimal, but hypothesized that strong competition occurs between young sporophytes.

Spore production by individual plants has also been determined. Greater spore production typically correlated with greater fertile frond number, and spore size did not differ substantially among the populations (Cousens 1981). In some populations Cousens found that spore germination approached zero, although spore production was substantial. Cousens' findings on spores with low germination may reflect limiting environmental factors during the year of their production. Years more favorable to spore production need occur only once during the lifespan of the perennial plant to allow persistence of the population (Cousens 1981).

It can be speculated that deerfern spores are spread by animal tracking. This phenomenon is visible at the Cedar Creek site, where the deerfern population is dense at the "center", with the plants becoming fewer and more scattered both up and down the old road. Cousens (1981) added data to this observation with his findings of deerfern gametophytes on clods of soils turned up by elk and deer. Wind and water may also carry the spores.

The isolated population of *B. spicant* in Idaho is comparable in abundance, vigor, and vitality to mean values for Olympic Peninsula populations (Cousens 1981). None of the values used to assess vigor; vitality or morphology distinguished the Idaho plants from those on the Olympic Peninsula (Cousens 1981).

Endangerment Status

Blechnum spicant is listed presently as a Region 1 Sensitive Species based on the disjunct population found in the Region. In Idaho, deerfern is considered to be "imperiled because of

rarity or because of other factors demonstrably making it very vulnerable to extinction" (State Rank 2) by the Idaho Natural Heritage Program (Groves and Moseley 1990).

Threats

Natural Threats

There are no known natural threats to *Blechnum spicant.* The effects from an extended drought, a flood, or fire are not known, or are not documented, for this species.

Human-caused Threats

On the West Coast, *B. spicant* is a common and sometimes ubiquitous plant. The only currently known phenomenon that could destroy a population of deerfern west of the Cascades would be massive habitat conversion (Gamon 1992), (e.g., campground development). In Washington State it has withstood timber harvest and related treatment (Gamon 1992).

A potential threat to the Idaho deerfern populations is loss of habitat, possibly through timber management (i.e. overstory removal, introduction of competitive early successional plant species), and definitely through major habitat conversion.

None of the known deerfern populations occur in areas that are near towns or other proposed developments, so they are not threatened by encroaching civilization at this time. This is a potential threat that should be considered now for future possible consequences.

Habitat loss, through whatever means, could reduce the distribution of deerfern and limit the overall viability of the species. All four locations of deerfern on the Idaho Panhandle occur in old growth or late seal stands of western redcedar and western hemlock. While cedar and hemlock forest types are a very common occurrence in north Idaho, old growth and late seral forests have been, and are currently being reduced through intensive forest management (Ohmann 1989).

Deerfern is unlikely to occur in great abundance in dense, young second growth forests, due to its habitat preference (Gamon 1992). West of the Cascades it is typically found in moister areas (microsites and draws) that are not well drained; areas where these dense young stands do not develop (Gamon 1992).

Very few studies have been initiated on the successional pathways after disturbance and fire for the moist forested habitats of north Idaho (Zack 1992). Stickney (1986) conducted a study, which described the development of seal vegetation for the 10 years following the Sundance Burn of 1967 in north Idaho. He documented successional development in western redcedar and western hemlock forest types by repeated measurements on 20 permanent pots and found that the degree of uniformity in species composition between these 20 sites was relatively low. The general pattern emerging for the first decade of forest succession in the Sundance indicates a rapid development of vegetative cover in which a shrub-dominated community succeeds the early prominence of herbs after the fourth year.

A previous study on fire succession in the Northern Rocky Mountains found that vegetation recovery from large fires could be characterized as variable, even though the eventual outcome is relatively consistent (Lyon and Stickney 1976). On a time scale of half a century, the authors found that postfire forest succession throughout the Northern Rockies has a consistent and

predictable pattern leading to dominant overstory conifers with an understory of shade-tolerant shrubs and herbs. On the other hand, early vegetal succession appears to be much less consistent and unpredictable, although it is usually accepted that herbaceous plants, shrubs, and trees appear in a more or less orderly sequence.

The deerfern within the harvest drainage at Distillery appears to be responding in the accepted manner as part of that early successional dominant herb stage. Following individual plants through monitoring, and gathering vegetation data for each plot, will assist in developing an understanding of the species' reaction to a major habitat change, and also give some insight into a successional pathway in a hemlock forest.

Observations of Idaho Populations in Relation to Threats

Observations of deerfern populations in northern Idaho suggest that disturbance from past road building, trail construction, and campground activity has not been significantly detrimental to populations. Deerfern plants inhabit several old corduroy roads, dating as far back as the 1950's, at several populations (i.e. Distillery Bay, Cedar Creek, and Bottle Lake RNA). These old roads are now mosscovered, shaded, and quite mesic. Several populations (i.e. Black Creek, Elizabeth Lake Trail, and Chateau Rock Trail) are found very near or right along maintained Forest Service trails. Moreover, the population at Hidden Creek Campground is quite abundant, despite limited camping activity during the summer and fall.

A certain degree of disturbance may actually be benefiting some deerfern populations by creating suitable habitat for spore germination. Some undocumented long-term observations have been made regarding disturbance, such as road construction, that support this contention and indicate that population size has expanded over time. However, pre-disturbance data for quantitatively comparison of individual populations is lacking.

To assess fully the effects of such activities as timber harvest on *Blechnum spicant* over time, seven monitoring plots were established in the deerfern population found near Distillery Bay in 1991. Portions of this drainage were clearcut in 1990 and short-term data will be gathered annually from 1991 to 2001 at these plots. Five plots were placed in areas with differing degrees of disturbance and two control plots were placed in undisturbed portions. Such monitoring data should provide insight into the response of deerfern to various degrees of disturbance and its ability to compete with disturbance-dependant and early successional herb and shrub species. Initial observations indicate that deerfern is responding favorably to this disturbance. Plants appear to be healthy and robust; their fronds are more upright and bear more sporophylls than those plants in undisturbed habitats (Blake personal observation). This may be just a short-term response. The increased amount of sunlight could ultimately "burn the plants out", since it naturally seems to prefer shaded, moist sites.

CONSERVATION PLAN

Conservation Plan Objectives

Blechnum spicant occurs at four locations on the Idaho Panhandle N. F., and ten locations on the Clearwater N. F. These populations occur in mature cedar and hemlock forests, which are common forest habitats found on the Forests. It is also where much of the timber management activity occurs. For this reason, the goal of this Conservation Strategy is to ensure that ample populations of *B. spicant* are protected to endure the species survival over time.

The purpose of this Conservation Strategy is to protect and maintain populations of *B. spicant* over time throughout its current range in Idaho and to gain a better understanding of the species and the populations on the Idaho Panhandle and Clearwater N. F. In order to maintain population viability, populations must be self-sustaining and adequately distributed throughout the species' range in the state.

The objective of this plan is to recognize the currently known populations on the Idaho Panhandle and Clearwater N.F., document what is known about them, and ensure that they are protected. Another goal of this strategy is to assure that any newly discovered populations of deerfern are evaluated for their contributions to the viability of the species. Since there are so few populations known at this time, any additional populations discovered should be protected. If or when 10 populations are known for each Forest, the viability of the species on the Forests can be reevaluated. Then, those populations that may conflict with other resource management goals can be evaluated to determine if they are necessary contributors to the overall viability of *B. spicant.* For example, the one individual plant at Bottle Lake is probably not substantially contributing to the overall viability, so a newly discovered large and viable population could be substituted for this site.

In addition to being self-sustaining and adequately distributed throughout the Idaho range, protected populations should be in undisturbed forest habitats (i.e. no past logging, mature/old growth stands, undisturbed hydrology). Ultimately, the largest undisturbed populations would be the protected ones, with the smaller, disturbed populations termed "experimental".

The long-term maintenance of the protected populations is critical if this plan is to succeed. Therefore, all known populations and their habitats should be protected all characteristics of these sites should be preserved. Any actions to areas adjacent to the protected deerfern sties should include appropriate buffers to assure that no light regime or hydrologic changes occur.

In order to attain this goal, while minimizing conflicts with other resource values, the following management objectives are proposed for *B. spicant:*

1. Identify and protect at least 10 populations of deerfern on both the Idaho Panhandle and Clearwater N.F. that are undisturbed, viable (reproducing) and large (over 50 plants).

2. Monitor these populations, and document the information and data in status reports.

3. Complete inventory surveys in areas not yet examined to delineate the overall distribution of *Blechnum spicant* in Idaho.

4. Inform Forest Service personnel of deerfern populations on their Districts

5. Conduct clearance surveys in suitable habitat

6. Keep this Conservation strategy/monitor plan current, adding new information as it becomes available.

Present Status of Known Idaho Populations

At this time, deerfern distribution in northern Idaho is limited, only fourteen known populations represent the extent of *B. spicant* distribution on the Forests. All of these populations should be protected and monitored, at this time.

Idaho Panhandle National Forests

The Lighting Creek population is not threatened, as it occurs in a designated old growth stand on the Sandpoint Ranger District (Hammet 1991). The Bottle Lake individual is also protected, since it is found in the Bottle Lake Research Natural Area.

The Distillery population has been affected by a Forest Service timber harvest, and monitoring plots have been established to attempt to assess the effects. A salvage harvest is scheduled for the areas at Distillery that were not clearcut. This salvage will resume in 1992, but should not occur in the deerfern drainage (Riley 1991). Thus, this population should not be threatened in the future.

A helicopter timber harvest is planned for the Upper Priest, just across Cedar creek from the population of deerfern. The sale should pose no threat to the population (Riley 1991). If the old road where a major portion of the deerfern is growing along Cedar Creek were reconstructed, it would probably destroy half the population (Riley 1991).

Clearwater National Forest

The majority of known deerfern populations located within the Clearwater N.F. are not threatened due to their remoteness. However, six of the ten populations have not been seen or relocated due to their remoteness since their initial discovery, as far back as 1970. Since these populations have not been monitored over the years, it is possible that some have been destroyed or altered since their initial discovery. In addition, most of these populations, although documented by voucher specimens, have very vague location and habitat data, making relocation extremely difficult. One of the HIGHEST priorities should be to relocate and fully document all the known populations in addition to surveying for new populations. Demographic information for all documented populations is presented in Appendix D.

The four populations that were recently discovered (post-1989) are: Chateau Rock Trail, Upper Glade Creek, Deadman Creek, and Gold Creek. The Chateau Rock Trail population is very small, consisting of approximately 30 individuals restricted to an area less than 3 yards square. Although this population is rather remote and located within the Pot Mountain roadless area, the plants are located directly along a trail that is used predominantly by summer and fall horse traffic. Damage

or elimination of this population is quite possible due to its proximity to the trail. It has been recommended that the present trail be diverted around this population (Lorain 1989).

The Upper Glade Creek and Deadman Creek populations were discovered by a seasonal botanist (Karen Gray) while doing a clearance survey for sensitive plants on the Lochsa Ranger District. The Upper Glade Creek population consists of a single clump of 5 individuals and some stray fronds covering an area of 1 square yard. This population fell within a very small proposed blowdown salvage timber sale (Split Blowdown, Unit 2). The salvage sale was subsequently dropped by the District due to the discovery of *Blechnum spicant* and the District is following this population. Deadman Creek population also small, consisting of 22 plants within a 5-10 square yard area and is near a clearcut unit that is proposed for burning.

The Gold Creek population was discovered in 1992, by Tim Lewis and Karen Gray, on the Pierce Ranger District. This population numbers 1000 to 2000 individuals and may be the largest on the Clearwater. This site is not currently threatened, and population appears to be vigorous; site quality excellent to good.

Monitoring

Monitoring of all four known populations of deerfern on the Idaho Panhandle and Clearwater National Forests is recommended. To date, only one population, Distillery Bay, has established long-term monitoring plots. Several additional long-term monitoring plots, including Ecodata information, should be established in designated populations. All other known populations should have at least Ecodata information gathered.

Gathering habitat data at each deerfern population using the Ecodata method, and repeating the Ecodata plots every third year, is a valuable method for monitoring the other deerfern populations and their habitat through time. With Ecopac, the Ecodata analysis program (USDA FS Chap.5 1988), the deerfern habitats could then be compared and analyzed further.

Idaho Panhandle National Forests

The monitoring technique used in 1991 at Distillery Bay involved the use of a survey instrument called TOPCON. The method is somewhat expensive and elaborate, but the accuracy and the final maps produced are excellent for use in this case. Which is to try and determine the effects of a timber clearcut harvest on portions of this population. This method is further explained in Appendix E. The other part of the Distillery Bay monitoring project involves gathering vegetation information within the established plots using the Ecodata method (USDA FS Chap.4 1988).

Information and habitat data for the Lightening Creek deerfern population was collected in 1991 using the Ecodata method. General Form 3 and Plant Composition Form 4 were used at this site (Hammet 1991).

Clearwater National Forest

No monitoring of the Clearwater National Forest populations is underway at present.

Implementation and Review

This plan should be reviewed and updated at appropriate intervals: when information from monitoring is evaluated, and when (or if) new populations of *B. spicant* are discovered.

The following activities should be accomplished within the specific times:

Clearwater National Forest

The proposed plan of action for *Blechnum spicant* on the Clearwater National Forest has been outlined in the Forests' Action Plan for Sensitive Plants (Lorain 1991). *Blechnum spicant* has been prioritized as a Level 1 species for the Forest, which includes those species that warrant the most attention. Work should be combined with research conducted on the Idaho Panhandle National Forests:

Year One

1. Relocate past collection sites on the Clearwater National Forest to update and fully describeeach knon population. Assess population status and collect specimens for herbarium study, if size of the population warrants it.

2. Survey for new populations in potentially suitable habitats. Areas of particular focus should include habitats along the North fork Clearwater River.

3. Inform Forest Service field personnel about deerfern distribution and its habitat as part of sensitive plant training.

4. Conduct clearance surveys where applicable.

Year Two

1. Gather Eclodata information on all relocated populations. Select a minimum of 3 of the largest populations and establish long-term demographic monitoring.

2. Continue survey for new populations in potential habitats. Conduct clearance surveys where applicable.

3. Meeting of Forest service and Idaho Conservation Data Center to discuss Conservation Strategy and recent information. Revise Conservation Strategy as appropriate.

Year Three to Five

1. Meeting concerning recent information and reevaluation. Revise Conservation Strategy as appropriate.

2. Continue monitoring studies.

Idaho Panhandle National Forest

Year One - 1992

1. Collect monitor plot data within all 7 established (1991) deerfern plots at the Distillery Bay deerfern population, using the Ecodata method.

2. Inform Forest Service field personnel about deerfern distribution, its habitat and the known populations on their districts as part of the sensitive plant training sessions.

3. Conduct clearance surveys for any projects in areas of potential deerfern habitat.

Year Two – 1993

1. Initiate monitoring of the Bottle Lake and Cedar Creek deerfern populations (even if it involves checking on the populations and documenting the information in a short report).

2. Inform Forest Service personnel of the deerfern populations on their districts and of potential habitat.

3. Conduct clearance surveys for any projects in areas of potential habitat.

Year Three – 1994

1. Gather data at each of seven Distillery monitor plots using the TOPCON surveying instrument, with the assistance of FS Land Surveyors.

2. Gather data and habitat information in the established plots (1991) Lightning Creek deerfern population, using Ecodata

3. Inform Forest Service personnel of populations and deerfern habitat.

4. Conduct clearance surveys for any projects in areas of potential habitat.

Year Four – 1995

1. Inform Forest Service personnel of the deerfern populations on their districts and of potential habitat.

2. Conduct clearance surveys for any projects in areas of potential habitat.

Year Five – 1996

1. Gather vegetation plot data for each Distillery monitor plot using the Ecodata method.

2. Inform Forest Service Personnel of the deerfern populations on their districts and of potential habitat.

3. Conduct clearance surveys for any projects in areas of potential habitat.

Year Six – 1997

1. Resurvey all monitor plots at Distillery using TOPCON, with assistance from FS Surveyors.
2. Gather Ecodata information at the Lightning Creek deerfern population.
3. Inform Forest Service personnel about deerfern populations and of potential habitat.
4. Conduct clearance surveys for any projects in areas of potential habitat.

Year Seven - 1998

1. Meeting of those Forest Service employees involved in this deerfern management/monitor plan, to discus and document the new information collected from monitoring and inventories. New information should be added to this document.
2. Inform Forest Service personnel of the deerfern populations on their districts and of potential habitat.
3. Conduct clearance surveys for any projects in areas of potential habitat.

Year Eight – 1999

Same as year four.

Year Nine – 2000

1. Collect final monitoring plot data at Distillery using TOPCON with the surveyors assistance.
2. Inform Forest Service personnel about deerfern and survey all proposed activity areas with potential habitat.

Year Ten – 2001

1. Collect final plot data using Ecodata at the Distillery population.
2. Begin the final analysis of the effects of the clearcut disturbance on the Distillery population of deerfern. The analysis results should be documented in a Final Monitoring Report, as well as the information summarized and included in this plan.
3. Analyze and document in a report the information gathered from the Lightning Creek Ecodata plot data.
4. Revise Conservation Strategy/Monitor plan as appropriate.
5. Continue informing personnel about deerfern and conducting clearance surveys in potential habitat.
6. Continue to check on and monitor all known and protected populations of *Blechnum spicant* on the Idaho Panhandle National Forests.

REFERENCES CITED

Cooper, S.V., K.E. Neiman, R. Steele, and D.W. Roberts, 1987. Forest Habitat Types of Northern Idaho; A Second Approximation, USDA Forest Service, Intermountain Research Station, General Technical Report INT-236

Cousens, M.I. 1973 Reproductive biology and autecology of *Blechnum spicant*. Dissertation Abstracts International. 34/08-b, 3672

Cousens, M.I. 1981 *Blechnum spicant:* Habitat vigor of optimal, marginal, and disjunct Populations, and field observations of gametophytes. Botanical Gazette 142(2):251-258.

Gamon, J. January 1992. Botanist, Washington Natural heritage Program. Personal communication.

Hammet, A.E. Forestry Tech., Sandpoint Ranger District. September 4, 1991. Observations of a New location of *Blechnum spicant*, on file at the Supervisors Office, IPNF Coeur d'Alene Idaho 83815.

Hitchcock, C.L. 1969. *Blechnum.* Pages 64-65. In: Vascular Plants of the Pacific Northwest, Part1, by C.L. Hitchcock, A. Cronquist, M. Ownbey and J.S. Thompson. Universtiy of Washington Press, Seattle.

Hitchcock, C.L. and Arthur Cronquist. 1973. Flora of the Pacific Northwest, Universtiy of Washington Press, Seattle, WA. 730 pages.

Idaho Conservation Data Center. 1991. Element occurrence location data from data base, Idaho Department of Fish & Game, Boise Idaho 83704

Klinka, K., V.J. Krajina, A. Ceska, and A.M. Scagel. 1989 Indicator plants of Coastal British Columbia, University of British Columbia Press, Vancouver Canada.

Linnaeus, C. 1753. Species Plantarum, Facsimile, Volumes One and Two.

Lorain, C.C. 1988 Floristic history and distribution of coastal disjunct plants of the Northern Rocky Mountains, M.S. Thesis, College of Forestry, Wildlife and Range, Moscow, Idaho 83843. 221 pp.

Lorain, C.C.1989 Field investigation of three Region 1 sensitive species on the Clearwater National Forest: *Asplenium trichomanes* (maidenhair spleenwort), Thelypteris nevadensis (Sierra woodfern), and *Dodecatheon hendersonii* (Henderson's shooting star); plus new locations for additional sensitive species. Idaho Natural Heritage Program, Idaho Department of Fish & Game, Boise Id. 19 p. plus appendices.

Lorain, C.C. 1991. Action plan for sensitive plant species on the Clearwater National Forest. Report to the Clearwater National Forest SO, Orofino ID.

Lyon, J.L. and P.F. Stickney. 1976. Early vegetal succession following large Northern Rocky Mountain Wildfires. Proceedings from Tall Timbers Fire Ecology Conference No. 14 and Intermountain Fire Research Council and Land Management Symposium. Pp. 355-375

Ohmann, J.L. Status ad trends of coniferous forest habitats in the western United States. Proceedings of the Western Raptor Management Symposium and Workshop: 26-28 October 1987, Boise, Idaho Washington D.C.: National Wildlife Federation {1989?} p.38-50. (National Wildlife Federation scientific & technical series: no. 12).

Riley, D. 1991. Biologist, Priest Lake RD. Personal communication, field notes, and KV Plan Information.

Soltis, P.S. and D.E. Soltis. 1988 Genetic variation and population structure in the fern *Blechnum Spicant* from Western North America. American Journal of Botany 75(1):37-44

Stickney, P. F. 1986. First decade plant succession following the Sundance forest fire, Northern Idaho. General Technical Report #197, Intermountain Research Station, Ogden, Utah 84401. 26 pp.

USDA Forest Service. 198. Ecosystem classification handbook FSH 3/88 R-1, Chapter 4 – Ecodata sampling methods, Chapter 5 – Data entry and analysis. Regional Office, Northern Region, Missoula MT.

USDA Forest Service, Forest Service Manual, Title 2600 and 2670 – Wildlife, Fish and Sensitive Plant Habitat Management. USDA Forest Service, Washington D.C.

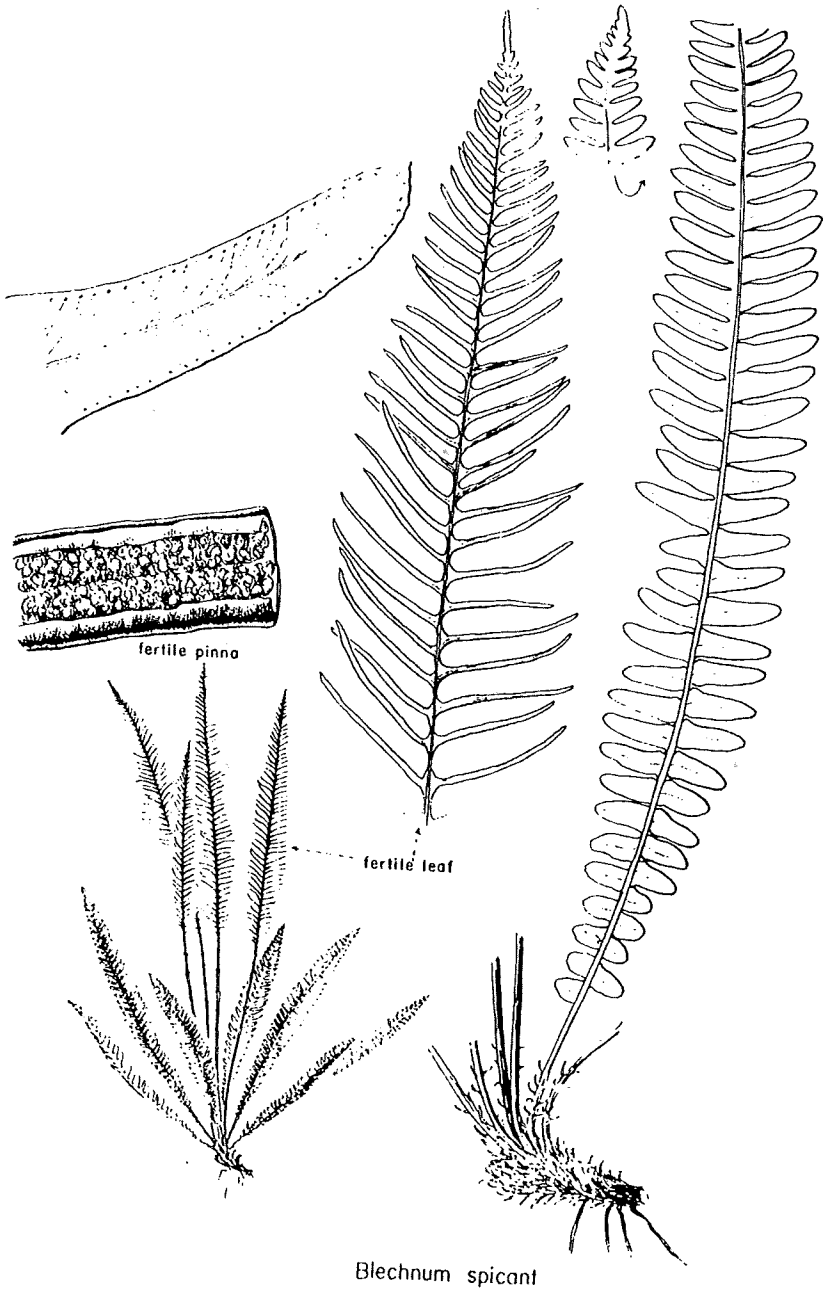
USDA Forest Service. 1988 Sensitive Plant Field Guide. USDA Forest Service Northern Region.

Zack, A. 1992. Forest Ecologist, Idaho Panhandle National Forests. Personal communication.

APPENDIX A

Line drawing of

Blechnum spicant

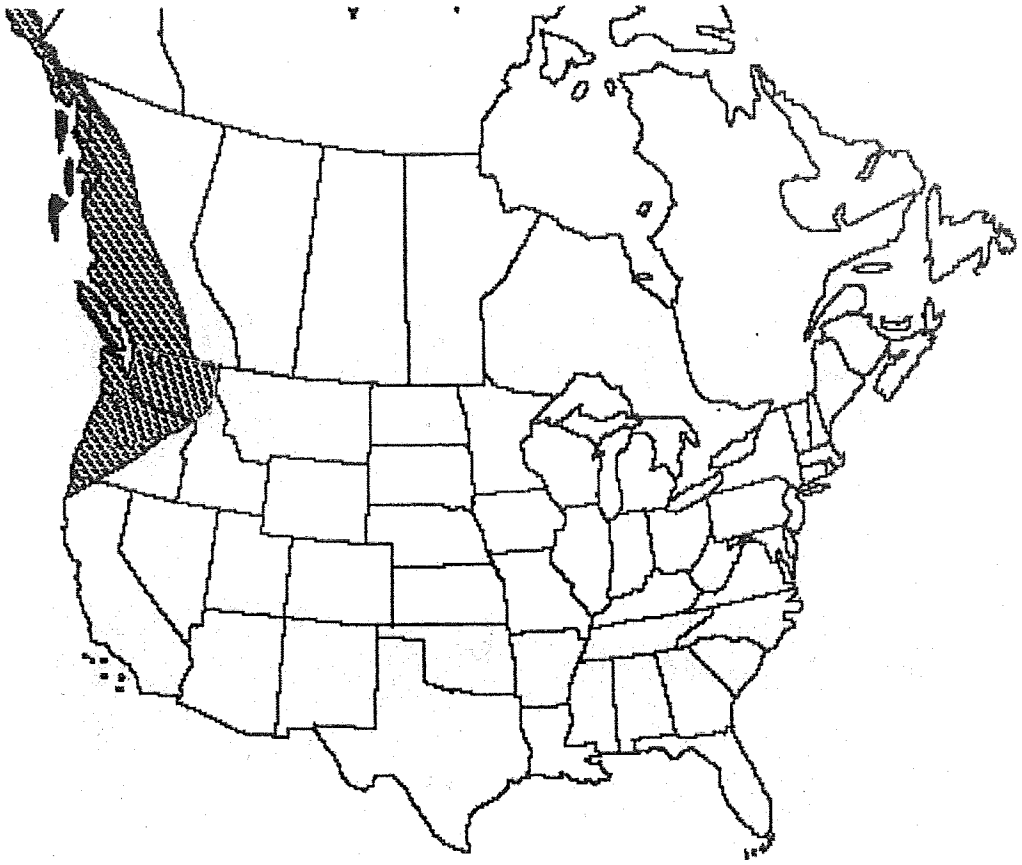


Blechnum spicant

Appendix B

Map of Overall Distribution

of Blechnum spicant



Appendix C

Map of Blechnum spicant

Distribution In Idaho

Appendix D

Demographic Data for

Idaho Deerfern Populations

Appendix E

Monitoring of the Distillery Bay

Deerfern Population

On September 23-25, 1991, seven monitoring plots were established in the deerfern population at Distillery Bay, Priest Lake. About 50% of the population had been affected during a 1990 clearcut timber harvest. This area is/was an old growth western hemlock and western redcedar forest. The site is mildly sloping with many small drainages flowing from this area into the west side of the lake. Most of the drainages are small v-shaped draws with abundant moisture. The one draw where the deerfern grows seems to be the largest in the area. All other drainages were surveyed during the summer of 1991 and none of the other drainages were found to have any *B. splicant.* This area is a very wet habitat type, with associated moisture-loving species like devil's cub (*Oplopanax horridium)*, ladyfern (*Athyrium felix-femina*), and sphagnum. Seeps and wet microsites are common within the deerfern draw.

The Distillery Bay timber sale was planned in the late 1970', before old growth forest and sensitive plants were recognized as they are now. It was then sole in 1980; logging began in 1984 and was completed in October of 1991. Numerous small clearcuts are scattered in the area. A salvage sale was also started in late summer 1991 and will be resumed and completed in 1992. Tim Layser, Priest Lake District Biologist found *B. spicant* in the summer of 1990, while following up on a report of an unusual fern in the area.

The data-gathering method use for the Distillery Bay monitoring project is a new technique for plant population monitoring. An instrument (brand name TOPCON was used that is normally used for land surveys and boundary verification. Jim Mans, Brad Bleckwenn, Mike Phillips (land surveyors with the IPNF) and myself, manned and operated the surveying instrument, one at the instrument and one or two in the plot holding mirrored receptor rods, referred to as range poles.

The TOPCON total station is approximately 12"x5"x5" and weighs about 11 pounds, not counting the tripod on which it sits. When the instrument cross hairs are focused on the prism at the top of the range pole. Each plant then has a unique x, y, and z coordinate along with a description and point number recorded on a handheld data recorder. This information is later downloaded to a PC where the data is organized, managed and mapped in Autocad (computerized graphic aid). This ultimately produces a series of plot maps that show the number of plants and their relationship to each other within the plot.

Each plant counted in the plots was identified as a JV (juvenile vegetative, plants that were less than 8" diameter), V (vegetative), F (flowering with 3 of fewer sporophylls), FP (for those plants with more than 3 sporophylls), and JF (juveniles less than 8" diameter with sporophylls). With this information we will be able to follow the deerferns through time – noting any increase or decrease in the population numbers; assessing the numbers (%) of sporulating vs. non-sporulating plants within and relative to the other plots; noting age/size (J, V, and F) distribution and numbers (%) within and relative to the other plots, and measuring any increase or decrease in juvenile, vegetative, and sporulating plants.

The first plot was measured as a 12-foot radius circular plot. We counted 230 individual plants, which took a whole day. We decided to do the remaining six plots as 6-foot radius. Three plots were established in clearcuts (2 different clearcuts), two plots were within the undisturbed area between clearcuts, and two plots were on the edges of the clearcuts and forested areas. It took three 10-hour days to complete the set-up and data gathering, including the time spent driving to the area from Coeur d'Alene (about 2 hours one-way). The plots will be recounted every third year, in 1994, 1997 and 2000. Habitat information and vegetation data will also be collected for each plot using the Ecodata method beginning in 1992, and again in 1996 and 2001.

The planned schedule for the monitoring is documented in this plan and also recorded in the KV plan for he Distillery Bay timber sale, Priest Lake Ranger District. (The KV plan has not been approved at this time, June 1992. Ecodata information will be gathered as scheduled in 1992. The remainder of the monitoring project may be completed as an Administrative Study.) The plot layout map and individual plot maps are included in Appendix F.

Monitoring Technique

Seven monitor plots have been established and permanently marked with steel fence posts at the plot centers. Four of the plots are below Road 2249, and three above the road. Refer to Appendix F for plot layout.

Permanent survey caps were placed beneath where the TOPCON survey and tripod were set up near each plot. These caps are yellow plastic and sit atop a rebar that has been planted in the ground; they sit low and may not be easily seen, especially when liter and duff can accumulate. The engineers will know how to find the caps, as they are tied in with control points. The instrument will be placed in this same location each time the plots are recounted.

Plot center is permanently marked with a flagged fence post. When the instrument is set up and ready, one or two people stand in the plot with the range poles placed at the base of individual deerfern plants. In some cases the plants are very close together and numerous, requiring the person get down and feel around to find the individual plant bases, then to place the end of the pole at the base point. In these thick areas, every individual is counted to the best of the counters' ability.

The range pole has a bubble level attached, which allows the rod to sit at an accurate vertical position. The shot, which is an infrared light beam, can be taken when the cross-hairs in the instrument lens are lined up with the mirrored prism at the top of the pole. The instrument is activated by pressing a button, which shows on the data collector screen as "taking shot". When measurement is complete an audible beeping pattern occurs. To confirm the shot, the relevant code button, JV (juvenile vegetative, less than 8" diameter), V (vegetative), F (flowering with three of fewer sporophylls), FP (for those plants with more than three sporophylls), or JF (juveniles with sporophylls), is presses and the shot is recorded in the data collector as such. It takes a few seconds to record the shot.

The work went smoothest with two people holding the pole and standing close together, so that the instrument didn't have to be repositioned.

Plot 1 – Plot 1 is just below (east of) Road 2249 on the south side of the drainage. This site could be affected by the clearcut above it, allowing in more light from the southwest. This plot has a radius of 12-feet. In the following years, this plot need not be 12-feet, but can have a 6-foot radius consistent with what the other plots have. A moss-covered log transects the plot, and approximately 15 individual deerferns were not counted due to the inability of the mirrored rod to record objects beneath the log. Two-hundred thirty plants were recorded in this plot.

Plot 2 – This plot will serve as the "control" plot. It is located just below Plot 1 in the undisturbed forested area. Plot center is near the creek on the north side of the drainage. Twenty-eight plants were recorded; five were outside of the 6 foot radius.

Plot 3 – Plot 3 is one of two plots that are placed on the edge of the clearcut and forested areas. It is down the drainage from Plot 2, and plot center is near the creek. Eighty-seven plants were counted here; 17 are outside of the 6-foot radius.

Plot 4 – Plot 4 is on the east side of the road, just below plot 3, in the clearcut (Unit 8). Some small hemlocks and shrubs were left in this portion of the drainage, so that the site has been opened up but does have some shade within. Plot center is near the creek. Plants here appeared to be very healthy with large, upright fronds and many sporophylls. Fifty-four plants were counted; 19 are outside of the 6-foot radius.

Plot 5 – Plot 5 is located on the west side of the road in the clearcut (Unit 9). The drainage forks on this side of the road. This plot is found in the north fork; plot center is near the creek, which here is subterranean. The plants here are in direct sun; the site seems much drier and brighter than Plot 4 in clearcut Unit 8. Seventeen plants ere counted here, 11 outside of the 6-foot radius.

Plot 6 – Plot 6 is located on the west side of the road, almost directly across from plot 5, in the south fork of the drainage in a seepy but open spot where a large, old tree stump has been uprooted. Deerfern here appear healthy and robust, many plants producing many sporophylls. Sixty-seven plants were recorded for this plot; 9 are outside of the 6-foot radius.

Plot 7 – This plot is found just up form Plot 6 in the south fork, and is on the south side of the drainage, at eh edge of the clearcut (Unit 9). Half the plot is in the "undisturbed" area and half is in the clearcut. A fireline is evident near the plot and is now being used as a gem trail. This site is very seepy and sphagnum moss is present. Sixty-six plants were counted here; 14 are outside of the 6-foot radius.

Distillery Deerfern Monitoring Year Schedule

TOPCON

1991, 1994, 1997, and 2000

ECODATA

1992, 1996, and 2001